



# SEQUENCE LISTING

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<120> Novel Bacterial RNase P Proteins and  
Their Use in Identifying Antibacterial Compounds

<130> 50093/016001

<140> US 09/516,061

<141> 2000-03-01

<160> 98

<170> FastSEQ for Windows Version 4.0

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<211> 417

<212> DNA

<213> Streptococcus mutans

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tatcgtgttg gactttcagt tggaaaaaga ttaggaaatg ctgtcgttag aaatgcgatt 240
aaacgaaaaat tgcgccatgt ctttatggaa cttggtcctt atttaggcac tcaagatttt 300
gttggtattg ctagaaaagg tgttgaggaa cttgattata gcacgatgaa aaaaaatctg 360
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<210> 2

<211> 477

<212> DNA

<213> Klebsiella pneumoniae

<400> 2

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gtcttccagc agccacaacg ggctggcacg ccgcaaata ccatcctcgg ccgcctgaat 180
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ctctcggaag cgttggaaaa attatggcgc cgccattgtc gcctggctcg cgggtcctga 420
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<210> 3

<211> 455

<212> DNA

<213> Salmonella paratyphi

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 acgccgcaaa tcaccatcct cggccgcctg aattcgctgg ggcattcccc tatcgggtctt 180  
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 cgtgaaagct tccgtctgcg ccagcatgaa ctctctgcaa tggatttcgt ggtgggtggcg 300  
 aaaaaagggg ttgccgacct cgataaccgt gctctctcgg aagcgttggg aaaattatgg 360  
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 tgatcagtcg gctgcttggg ccgcattgtc gtttc 455

<210> 4  
 <211> 528  
 <212> DNA  
 <213> *Pseudomonas aeruginosa*

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 gaaagccctg ctgacgcccc tggcgtggcc gacggtactc atgcataggt cgatgccccg 480  
 gcatcccgat ccctgtagtg tcatcccccc ttcgatgacc cggcaccg 528

<210> 5  
 <211> 510  
 <212> DNA  
 <213> *Corynebacterium diphtheriae*

<400> 5  
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 gtcactctta caagctcgaa tagaacgacg gtgctacctt cacagcaca gctcagcaat 120  
 tccgaacagt tccgcgcaac gattcggaag ggcaagcgtg ctgggaggag caccgtcgtt 180  
 cttcattttt atgctgaggg gaccgcgggc aaccttgcaa ccgcaggcgg cccgcgattc 240  
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 agggcgatac cgccagcggc gacagcaagt tatgaggagt tgcgggcaga tgtgcaggca 420  
 gcaactcgaca agctcaaccg caagcgataa ggcgggtact cgccctcgtg ggctgggttag 480  
 tcgcgcattg tttgatgcgg tgcggttcta 510

<210> 6  
 <211> 504  
 <212> DNA  
 <213> *Chlamydia trachomatis*

<400> 6  
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 gcaactttac gaatagttcc ttctcgtcac tcgaacatcc gtaaagtagg ggttactggt 240  
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 tttaggcatg tgcgacaaaa tcttcccgca tgtcaagtgg tagtgtctcc taaagggggc 360  
 actctaccaa attttggttaa actatccgcg gatcttctta agcatattcc agaggctttg 420  
 cctctcgtaa cttcttctaa gtagtttttt attttggtca aaaaataaaa aaccattcca 480

cgctatagag gcatggaatg ggaa

504

<210> 7

<211> 492

<212> DNA

<213> *Vibrio cholerae*

<400> 7

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ggcagcgttg gccgataagt ggactaataa accactggta aagttttaca ataccaatgg 60
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ttcattgctc aaatccttgcg cgctcttttt ggcgatgaca acaaaatcctt tgttagccag 180
ttgattttga tgtaagcgaa agctttctct gcaaatacgt ttgaatcgat tacggccgac 240
ggcagttttg atctgctttt taggaaccgc gagtcccaaa cgaggatgag aaagggttatt 300
agcgcgagcg atgattgtga gatgaggaga accagcactg tgagcttgct ggaagacttt 360
ttgataatgt tcgggagtta acaaacgtaa ctcccgattg aatgcgtacg tactcaaaat 420
aatcgagat tattttgaca ggcgcttacg gccttttgca cgacgtgcat tcagaacttt 480
acgaccgttc gc 492
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<210> 8

<211> 492

<212> DNA

<213> *Neisseria gonorrhoea*

<400> 8

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tcatacctgt ttcccgcatc cggttgcggg gttgccgaac atgagttgtg ccagttccgc 120
ccttgccctgt tttgcggtag ccctgtcgaa tttccggcgg acgcgcacga cgaaatcctg 180
aggcggcagc cggttttttgt tcaatctgaa ccagtcgcgg atgacgcgtt tcatatagtt 240
ccgctcgttg gcgcgtttg cggttttttt gccgaccacc agaccgatgc ggggatggtc 300
cagcccgttg ccgtttgagc gcgaaacttg cagcaggtcg cggctgcggc ggtttctgaa 360
tgcaaaaacg gatgaaaaat catccgtttt taacaagcgg tactgccttc cgaagcggta 420
gtccaaaatt acactgccag gcgtttgcgg cctttggcac ggcgtgcggc caatactgcg 480
cgtccgcgcg gt 492
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<210> 9

<211> 492

<212> DNA

<213> *Neisseria meningitidis*

<400> 9

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tgttccttag tatgggaaac ccgttgccgt ctgaaccttg cctgcagagt accgttctga 60
tcatgcctgt ttccctgcac cggttgcggg gttgccgaac atgagttgtg ccagttccgc 120
ccttgccctgt tttgcggtag ccctgtcgaa tttacggcgg acgcgcacga cgaaatcctg 180
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cagcccgttg ccgtttgaac gcgaaacttg cagcaggtcg cggctgcggc ggtttctgaa 360
tgcaaaaacg gatgaaaaat catccgtttt caacaagcgg tactgccttc cgaagcggta 420
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cgtccgcgcg gc 492
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<210> 10

<211> 462

<212> DNA

<213> *Streptococcus pyogenes*

<400> 10

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cacgaaatcc tctgacttca gctgatgccc taatgccatg ataacatgac gtatctttcg 240
tttgactgca tttctgggtga ctgcatttcc tattttttta ccgacagaaa taccacacag 300
gaagtgggtct tggcctctat ttaaatagata aatgacaaaat tttcgatttg ctgtactttt 360
tccatcctta aatatggctt ggaaatcttt ctacgcttg acacgatagg tcttcttcaa 420
aatttaactc caatatctaa attattacca ttataccaca tc 462

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<210> 11

<211> 492

<212> DNA

<213> *Bordetella pertussis*

<400> 11

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tcatcgcgct atccgtgtga agtgagcadc tacttcggcg cgcgccgagc gtttcagggc 120
cgtgaggctt gccggtgtca gcttgctgtg cagccgcacc acgtaatcct gggccggcag 180
ggcaagccgg cgagcccggg acgcttcgcg gatgaccgcg ttcaagggtat tgcgcgtcac 240
ggcgcggggc gcaaaacgct tggcgatcac caggcccagg cgcgcgcgcg ccggctgggtc 300
atcagcaggg gcacagggcg aggcgctgac aataaagaaa gcccctcggg ccagtcgccg 360
gcctttgagg gcggcgggcaa actcggaggg gcgatgcaat cgcgcctccg caggggagcgt 420
ggcgcgcggc atgggtgacg tgacggagac tggcgacggg gccggcgggc atgctcctgt 480
tacaggcaat cc 492

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<210> 12

<211> 534

<212> DNA

<213> *Porphyromonas gingivalis*

<400> 12

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ttactcgttt ttcaaagccg atgaaggtag atttcgggca attctgatca gactcttttg 120
catcgctctc tccactgtac gaaagtcagg aagttcatcc gatactacca taaatgcaat 180
agtagcatag atctgtctct cttggaggac atcgttcagg aggtgtttgt tgagccgata 240
agcctccctg accaaacgct tgaccctatt gcgcttcacg gctcgcctaa accttttctt 300
tgctacgctt accagcatgg aggaatatgc aactcgatgc tccgatccca gacggtagac 360
tacgcgtaga ggataaacga caaacgcctt gccttcgcca aagaccgtat tgatttcac 420
gcgaagatag aggcgttcgc ttttgatag gccgaatgta ggcggagagg tcatttccc 480
ttgaggtaat cctctaattg catagccata gaaggatatt gctcggtcgg cgca 534

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<210> 13

<211> 495

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 13

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taatacatgg agtagatttt tctccatctc tgcgtatccc aagggttcga ctcttttctg 180
agcaatgaca acaaagtcga catctttctac cagactccct tttgcattct ggataatatg 240
ccgaatccgt cgcttaattt gattttctagt gacggcatte ccagttttt tgctaaactga 300
tagacctact cgaaaacggg ttttctgggt ttctaattgg tagaccacaa atttgcgatt 360
agcaaaactt gtccctctct tgaaaatcgc cttaaaatct ttctctcttt ttacacgaaa 420
gtttttcttc aaaactcaac tccatctatt aaattactac tattatacca tatttttcaa 480
aaaagccaat catag 495

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<210> 14

<211> 465  
 <212> DNA  
 <213> *Clostridium difficile*

<400> 14  
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 agtagcatcc ttactagata cccttgctat aaatactata tcatatccag gcttaatttt 180  
 ttcatacaata tttaatctgt aggcctcttt tattaatctt cttactctat tcctagtaat 240  
 agcttttcct actttttttg aaacagaaat acctactcta ctataatctg atttattttt 300  
 aagtataat attactaaat atttgtttgc aaaagatttg ccgtgtttat atacttttct 360  
 aaaatcagag tcttttttca accctttagt cctattaaag tccatagtta acctccataa 420  
 acacagctat gaatcgtaat tatttacaca aaaaggccac ctttg 465

<210> 15  
 <211> 447  
 <212> DNA  
 <213> *Camphylobacter jejuni*

<400> 15  
 aagcagcggg ttttaaaggg cttagaatt tctgataaaa acggagtatt ttaggcata 60  
 tcatttgaaa cattctagtt ttttcaatcc ccattttaga tttttttcta acctagaaaa 120  
 agaaagttca gtgatttcat ttttagctac aaaaatatat ttgccatctt gaagatatct 180  
 ttcaacttta gcaaacaaag ctcttaaaat tcgttttgaa cgatttctaa cactgcttt 240  
 tccaactttt ttactagcaa caactgctat ttttttttca taactattca gataaaaaat 300  
 gatcacacct tcgcaatgcc attttttgcc tactttatat acagatgaaa attcctcgtt 360  
 tgtgctaaat ttatcaaaat ttttcacaca gcaagtcttt ttctaccttt agcgcgtctt 420  
 gcattgatca ctttgcgacc attttta 447

<210> 16  
 <211> 480  
 <212> DNA  
 <213> *Bacillus anthracis*

<400> 16  
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 tcatttcctt acgctacttt ttattctttt cataccagag cgtttaaaga catgaattaa 120  
 gcttttcttt aattcttcat atgtcatctc tgcacaaggc ttcccttgcta ttataacaaa 180  
 atcttttcca gaatctatct catcttttaa ttctgtgatc gactggcgaa tcatacgttt 240  
 aattcgggta cgcactactg catttcctat cttcttgctg acagaaaggc caatacgaaa 300  
 gtttggtgctgc tcttctttat ctagttgata gacaacaaat tgacgattcg cattcgattt 360  
 tcctttttga aaaaccgtct ggaattcatc attctttttt atacgatgtt ttttcttcat 420  
 atcaattgac actcctgtag ttcatacgag gaaattcact attattagaa aaaaagacca 480

<210> 17  
 <211> 480  
 <212> DNA  
 <213> *Mycobacterium avium*

<400> 17  
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 tcacggcccg gttcccgccg gcatgcgccg caggcaccgc tgcagttcct gcgccaggcg 120  
 cgccgacgac gcgggtccggc ttccgggcag cgcgcgaatc accagccggg cggatggttc 180  
 gagttcgccg agcaggggccc gggccacgtg acgcagccgg cggggccacgc ggtgtcgttg 240  
 caccgcgctc ccgacggcct tcccgacgac cagcccgacc cgtgggcccc cggattcgctc 300  
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gtgcttcacc gtcgctcaa actcggttga ccgctcatg cggttgctg cggaagcac 420  
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<210> 18  
 <211> 474  
 <212> DNA  
 <213> *Staphylococcus aureus*

<400> 18  
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 atgttattgg aaaaagctta ccgaattaaa aagaatgcag attttcagag aatatataaa 120  
 aaaggctcatt ctgtagccaa cagacaattt gttgtataca cttgtaataa taaagaaata 180  
 gaccattttc gcttaggtat tagtgtttct aaaaaactag gtaatgcagt gttaagaaac 240  
 aagattaaaa gagcaatagc tgaaaatttc aaagtacata agtcgcatat attggccaaa 300  
 gatattattg taatagcaag acagccagct aaagatatga cgactttaca aatacagaat 360  
 agtcttgagc acgtacttaa aattgccaaa gtttttaata aaaagattaa gtaaggatag 420  
 ggtaggggaa ggaaaacatt aaccactcaa cacatcccg agtcttacct caga 474

<210> 19  
 <211> 474  
 <212> DNA  
 <213> *Staphylococcus aureus*

<400> 19  
 gttataagct caatagaagt ttaaatatag cttcaaataa aaacgataaa taagcgagtg 60  
 atgttattgg aaaaagctta ccgaattaaa aagaatgcag attttcagag aatatataaa 120  
 aaaggctcatt ctgtagccaa cagacaattt gttgtataca cttgtaataa taaagaaata 180  
 gaccattttc gcttaggtat tagtgtttct aaaaaactag gtaatgcagt gttaagaaac 240  
 aagattaaaa gagcaatagc tgaaaatttc aaagtacata agtcgcatat attggccaaa 300  
 gatattattg taatagcaag acagccagct aaagatatga cgactttaca aatacagaat 360  
 agtcttgagc acgtacttaa aattgccaaa gtttttaata aaaagattaa gtaaggatag 420  
 ggtaggggaa ggaaaacatt aaccactcaa cacatcccg agtcttacct caga 474

<210> 20  
 <211> 119  
 <212> PRT  
 <213> *Streptococcus mutans*

<400> 20  
 Val Leu Lys Lys Ala Tyr Arg Val Lys Ser Asp Lys Asp Phe Gln Ala  
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 Ile Phe Thr Glu Gly Arg Ser Val Ala Asn Arg Lys Phe Val Val Tyr  
 20 25 30  
 Ser Leu Glu Lys Asp Gln Ser His Tyr Arg Val Gly Leu Ser Val Gly  
 35 40 45  
 Lys Arg Leu Gly Asn Ala Val Val Arg Asn Ala Ile Lys Arg Lys Leu  
 50 55 60  
 Arg His Val Leu Met Glu Leu Gly Pro Tyr Leu Gly Thr Gln Asp Phe  
 65 70 75 80  
 Val Val Ile Ala Arg Lys Gly Val Glu Glu Leu Asp Tyr Ser Thr Met  
 85 90 95  
 Lys Lys Asn Leu Val His Val Leu Lys Leu Ala Lys Leu Tyr Gln Glu  
 100 105 110  
 Gly Ser Ile Arg Glu Lys Glu  
 115

<210> 21  
 <211> 119  
 <212> PRT  
 <213> *Klebsiella pneumoniae*

<400> 21  
 Val Val Lys Leu Ala Phe Pro Arg Glu Leu Arg Leu Leu Thr Pro Ser  
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 His Phe Thr Phe Val Phe Gln Gln Pro Gln Arg Ala Gly Thr Pro Gln  
 20 25 30  
 Ile Thr Ile Leu Gly Arg Leu Asn Ser Leu Gly His Pro Arg Ile Gly  
 35 40 45  
 Leu Thr Val Ala Lys Lys Asn Val Lys Arg Ala His Glu Arg Asn Arg  
 50 55 60  
 Ile Lys Arg Leu Thr Arg Glu Ser Phe Arg Leu Arg Gln His Glu Leu  
 65 70 75 80  
 Pro Pro Met Asp Phe Val Val Val Ala Lys Arg Gly Val Ala Asp Leu  
 85 90 95  
 Asp Asn Arg Ala Leu Ser Glu Ala Leu Glu Lys Leu Trp Arg Arg His  
 100 105 110  
 Cys Arg Leu Ala Arg Gly Ser  
 115

<210> 22  
 <211> 110  
 <212> PRT  
 <213> *Salmonella paratyphi*

<400> 22  
 Val Thr Phe Val Asn Ser Arg Ser Phe His Ile Arg Leu Pro Ala Thr  
 1 5 10 15  
 Ser Thr Gly Cys Thr Pro Gln Ile Thr Ile Leu Gly Arg Leu Asn Ser  
 20 25 30  
 Leu Gly His Pro Arg Ile Gly Leu Thr Val Ala Lys Lys Asn Val Arg  
 35 40 45  
 Arg Ala His Glu Arg Asn Arg Ile Lys Arg Leu Thr Arg Glu Ser Phe  
 50 55 60  
 Arg Leu Arg Gln His Glu Leu Pro Ala Met Asp Phe Val Val Val Ala  
 65 70 75 80  
 Lys Lys Gly Val Ala Asp Leu Asp Asn Arg Ala Leu Ser Glu Ala Leu  
 85 90 95  
 Glu Lys Leu Trp Arg Arg His Cys Arg Leu Ala Arg Gly Ser  
 100 105 110

<210> 23  
 <211> 135  
 <212> PRT  
 <213> *Pseudomonas aeruginosa*

<400> 23  
 Val Val Ser Arg Asp Phe Asp Arg Asp Lys Arg Leu Leu Thr Ala Arg  
 1 5 10 15  
 Gln Phe Ser Ala Val Phe Asp Ser Pro Thr Gly Lys Val Pro Gly Lys  
 20 25 30

His Val Leu Leu Leu Ala Arg Glu Asn Gly Leu Asp His Pro Arg Leu  
           35                          40                          45  
 Gly Leu Val Ile Gly Lys Lys Asn Val Lys Leu Ala Val Gln Arg Asn  
           50                          55                          60  
 Arg Leu Lys Arg Leu Ile Arg Glu Ser Phe Arg His Asn Gln Glu Thr  
 65                          70                          75                          80  
 Leu Ala Gly Trp Asp Ile Val Val Ile Ala Arg Lys Gly Leu Gly Glu  
                           85                          90                          95  
 Leu Glu Asn Pro Glu Leu His Gln Gln Phe Gly Lys Leu Trp Lys Arg  
                           100                          105                          110  
 Leu Leu Arg Asn Arg Pro Arg Thr Glu Ser Pro Ala Asp Ala Pro Gly  
                           115                          120                          125  
 Val Ala Asp Gly Thr His Ala  
           130                          135

<210> 24  
 <211> 129  
 <212> PRT  
 <213> *Corynebacterium diphtheriae*

<400> 24  
 Val Thr Leu Thr Ser Ser Asn Arg Thr Thr Val Leu Pro Ser Gln His  
 1                          5                          10                          15  
 Lys Leu Ser Asn Ser Glu Gln Phe Arg Ala Thr Ile Arg Lys Gly Lys  
           20                          25                          30  
 Arg Ala Gly Arg Ser Thr Val Val Leu His Phe Tyr Ala Glu Ala Thr  
           35                          40                          45  
 Ala Gly Asn Leu Ala Thr Ala Gly Gly Pro Arg Phe Gly Leu Val Val  
           50                          55                          60  
 Ser Lys Ala Val Gly Asn Ala Val Thr Arg His Arg Val Ser Arg Gln  
 65                          70                          75                          80  
 Leu Arg His Val Val Ile Ala Met Lys Asp Gln Phe Pro Ala Ser Ser  
                           85                          90                          95  
 His Val Val Val Arg Ala Ile Pro Pro Ala Ala Thr Ala Ser Tyr Glu  
                           100                          105                          110  
 Glu Leu Arg Ala Asp Val Gln Ala Ala Leu Asp Lys Leu Asn Arg Lys  
           115                          120                          125  
 Arg

<210> 25  
 <211> 119  
 <212> PRT  
 <213> *Chlamydia trachomatis*

<400> 25  
 Val His Arg Leu Thr Leu Pro Lys Ser Ala Arg Leu Leu Lys Arg Lys  
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 Gln Phe Val Tyr Val Gln Arg Cys Gly Gln Tyr Cys Arg Thr Asp Gln  
           20                          25                          30  
 Ala Thr Leu Arg Ile Val Pro Ser Arg His Ser Asn Ile Arg Lys Val  
           35                          40                          45  
 Gly Val Thr Val Ser Lys Lys Phe Gly Lys Ala His Gln Arg Asn Arg  
           50                          55                          60  
 Phe Lys Arg Ile Val Arg Glu Ala Phe Arg His Val Arg Pro Asn Leu



65		70		75		80									
Pro	Ala	Cys	Gln	Val	Val	Val	Ser	Pro	Lys	Gly	Gly	Thr	Leu	Pro	Asn
		85		90		95									
Phe	Gly	Lys	Leu	Ser	Ala	Asp	Leu	Leu	Lys	His	Ile	Pro	Glu	Ala	Leu
		100					105						110		
Pro	Leu	Val	Thr	Ser	Ser	Lys									
		115													

<210> 26  
 <211> 122  
 <212> PRT  
 <213> *Vibrio cholerae*

<400> 26
Ser Arg Ile Ile Leu Ser Thr Tyr Ala Phe Asn Arg Glu Leu Arg Leu
1 5 10 15
Leu Thr Pro Glu His Tyr Gln Lys Val Phe Gln Gln Ala His Ser Ala
20 25 30
Gly Ser Pro His Leu Thr Ile Ile Ala Arg Ala Asn Asn Leu Ser His
35 40 45
Pro Arg Leu Gly Leu Ala Val Pro Lys Lys Gln Ile Lys Thr Ala Val
50 55 60
Gly Arg Asn Arg Phe Lys Arg Ile Cys Arg Glu Ser Phe Arg Leu His
65 70 75 80
Gln Asn Gln Leu Ala Asn Lys Asp Phe Val Val Ile Ala Lys Lys Ser
85 90 95
Ala Gln Asp Leu Ser Asn Glu Glu Leu Phe Asn Leu Leu Gly Lys Leu
100 105 110
Trp Gln Arg Leu Ser Arg Pro Ser Arg Gly
115 120

<210> 27  
 <211> 123  
 <212> PRT  
 <213> *Neisseria gonorrhoea*

<400> 27
Val Ile Leu Asp Tyr Arg Phe Gly Arg Gln Tyr Arg Leu Leu Lys Thr
1 5 10 15
Asp Asp Phe Ser Ser Val Phe Ala Phe Arg Asn Arg Arg Ser Arg Asp
20 25 30
Leu Leu Gln Val Ser Arg Ser Asn Gly Asn Gly Leu Asp His Pro Arg
35 40 45
Ile Gly Leu Val Val Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg
50 55 60
Asn Tyr Met Lys Arg Val Ile Arg Asp Trp Phe Arg Leu Asn Lys Asn
65 70 75 80
Arg Leu Pro Pro Gln Asp Phe Val Val Arg Val Arg Arg Lys Phe Asp
85 90 95
Arg Ala Thr Ala Lys Gln Ala Arg Ala Glu Leu Ala Gln Leu Met Phe
100 105 110
Gly Asn Pro Ala Thr Gly Cys Gly Lys Gln Val
115 120

<210> 28  
 <211> 123  
 <212> PRT  
 <213> *Neisseria meningitidis*

<400> 28  
 Val Ile Leu Asp Tyr Arg Phe Gly Arg Gln Tyr Arg Leu Leu Lys Thr  
 1 5 10 15  
 Asp Asp Phe Ser Ser Val Phe Ala Phe Arg Asn Arg Arg Ser Arg Asp  
 20 25 30  
 Leu Leu Gln Val Ser Arg Ser Asn Gly Asn Gly Leu Asp His Pro Arg  
 35 40 45  
 Ile Gly Leu Val Val Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg  
 50 55 60  
 Asn Tyr Met Lys Arg Val Ile Arg Asp Trp Phe Arg Leu Asn Lys Asn  
 65 70 75 80  
 Arg Leu Pro Pro Gln Asp Phe Val Val Arg Val Arg Arg Lys Phe Asp  
 85 90 95  
 Arg Ala Thr Ala Lys Gln Ala Arg Ala Glu Leu Ala Gln Leu Met Phe  
 100 105 110  
 Gly Asn Pro Ala Thr Gly Cys Arg Lys Gln Ala  
 115 120

<210> 29  
 <211> 113  
 <212> PRT  
 <213> *Streptococcus pyogenes*

<400> 29  
 Val Lys Arg Glu Lys Asp Phe Gln Ala Ile Phe Lys Asp Gly Lys Ser  
 1 5 10 15  
 Thr Ala Asn Arg Lys Phe Val Ile Tyr His Leu Asn Arg Gly Gln Asp  
 20 25 30  
 His Phe Arg Val Gly Ile Ser Val Gly Lys Lys Ile Gly Asn Ala Val  
 35 40 45  
 Thr Arg Asn Ala Val Lys Arg Lys Ile Arg His Val Ile Met Ala Leu  
 50 55 60  
 Gly His Gln Leu Lys Ser Glu Asp Phe Val Val Ile Ala Arg Lys Gly  
 65 70 75 80  
 Val Glu Ser Leu Glu Tyr Gln Glu Leu Gln Gln Asn Leu His His Val  
 85 90 95  
 Leu Lys Leu Ala Gln Leu Leu Glu Lys Gly Phe Glu Ser Glu Glu Lys  
 100 105 110  
 His

<210> 30  
 <211> 123  
 <212> PRT  
 <213> *Bordetella pertussis*

<400> 30  
 Met Pro Arg Ala Thr Leu Pro Ala Glu Ala Arg Leu His Arg Pro Ser  
 1 5 10 15  
 Glu Phe Ala Ala Ala Leu Lys Gly Arg Arg Leu Ala Arg Gly Ala Phe



Phe Val Val Ile Ala Arg Lys Gly Val Glu Thr Leu Gly Tyr Ala Glu  
                             85                            90                            95  
 Met Glu Lys Asn Leu Leu His Val Leu Lys Leu Ser Lys Ile Tyr Arg  
                             100                            105                            110  
 Glu Gly Asn Gly Ser Glu Lys Glu Thr Lys Val Asp  
                             115                            120

<210> 33  
 <211> 114  
 <212> PRT  
 <213> Clostridium difficile

<400> 33  
 Met Asp Phe Asn Arg Thr Lys Gly Leu Lys Lys Asp Ser Asp Phe Arg  
   1                            5                            10                            15  
 Lys Val Tyr Lys His Gly Lys Ser Phe Ala Asn Lys Tyr Leu Val Ile  
                             20                            25                            30  
 Tyr Ile Leu Lys Asn Lys Ser Asp Tyr Ser Arg Val Gly Ile Ser Val  
                             35                            40                            45  
 Ser Lys Lys Val Gly Lys Ala Ile Thr Arg Asn Arg Val Arg Arg Leu  
                             50                            55                            60  
 Ile Lys Glu Ala Tyr Arg Leu Asn Ile Asp Glu Lys Ile Lys Pro Gly  
  65                            70                            75                            80  
 Tyr Asp Ile Val Phe Ile Ala Arg Val Ser Ser Lys Asp Ala Thr Phe  
                             85                            90                            95  
 Lys Asp Ile Asp Lys Ser Ile Lys Asn Leu Val Lys Arg Thr Asp Ile  
                             100                            105                            110  
 Ser Ile

<210> 34  
 <211> 108  
 <212> PRT  
 <213> Camphylobacter jejuni

<400> 34  
 Val Lys Asn Phe Asp Lys Phe Ser Thr Asn Glu Glu Phe Ser Ser Val  
   1                            5                            10                            15  
 Tyr Lys Val Gly Lys Lys Trp His Cys Glu Gly Val Ile Ile Phe Tyr  
                             20                            25                            30  
 Leu Asn Ser Tyr Glu Lys Lys Ile Ala Val Val Ala Ser Lys Lys Val  
                             35                            40                            45  
 Gly Lys Ala Val Val Arg Asn Arg Ser Lys Arg Ile Leu Arg Ala Leu  
                             50                            55                            60  
 Phe Ala Lys Phe Glu Arg Tyr Leu Gln Asp Gly Lys Tyr Ile Phe Val  
  65                            70                            75                            80  
 Ala Lys Asn Glu Ile Thr Glu Leu Ser Phe Ser Arg Leu Glu Lys Asn  
                             85                            90                            95  
 Leu Lys Trp Gly Leu Lys Lys Leu Glu Cys Phe Lys  
                             100                            105

<210> 35  
 <211> 119  
 <212> PRT

<213> Bacillus anthracis

<400> 35

```
Met Lys Lys Lys His Arg Ile Lys Lys Asn Asp Glu Phe Gln Thr Val
 1          5          10          15
Phe Gln Lys Gly Lys Ser Asn Ala Asn Arg Gln Phe Val Val Tyr Gln
          20          25          30
Leu Asp Lys Glu Glu Gln Pro Asn Phe Arg Ile Gly Leu Ser Val Ser
          35          40          45
Lys Lys Ile Gly Asn Ala Val Arg Asn Arg Ile Lys Arg Met Ile
          50          55          60
Arg Gln Ser Ile Thr Glu Leu Lys Asp Glu Ile Asp Ser Gly Lys Asp
65          70          75          80
Phe Val Ile Ile Ala Arg Lys Pro Cys Ala Glu Met Thr Tyr Glu Glu
          85          90          95
Leu Lys Lys Ser Leu Ile His Val Phe Lys Arg Ser Gly Met Lys Arg
          100          105          110
Ile Lys Ser Ser Val Arg Lys
          115
```

<210> 36

<211> 119

<212> PRT

<213> Mycobacterium avium

<400> 36

```
Val Leu Pro Ala Arg Asn Arg Met Thr Arg Ser Thr Glu Phe Asp Ala
 1          5          10          15
Thr Val Lys His Gly Thr Arg Met Ala Gln Pro Asp Ile Val Val His
          20          25          30
Leu Arg Arg Asp Ser Glu Pro Asp Asp Glu Ser Ala Gly Pro Arg Val
          35          40          45
Gly Leu Val Val Gly Lys Ala Val Gly Thr Ala Val Gln Arg His Arg
          50          55          60
Val Ala Arg Arg Leu Arg His Val Ala Arg Ala Leu Leu Gly Glu Leu
65          70          75          80
Glu Pro Ser Asp Arg Leu Val Ile Arg Ala Leu Pro Gly Ser Arg Thr
          85          90          95
Ala Ser Ser Ala Arg Leu Ala Gln Glu Leu Gln Arg Cys Leu Arg Arg
          100          105          110
Met Pro Ala Gly Thr Gly Pro
          115
```

<210> 37

<211> 117

<212> PRT

<213> Staphylococcus aureus

<400> 37

```
Met Leu Leu Glu Lys Ala Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gln
 1          5          10          15
Arg Ile Tyr Lys Lys Gly His Ser Val Ala Asn Arg Gln Phe Val Val
          20          25          30
Tyr Thr Cys Asn Asn Lys Glu Ile Asp His Phe Arg Leu Gly Ile Ser
          35          40          45
```

Val	Ser	Lys	Lys	Leu	Gly	Asn	Ala	Val	Leu	Arg	Asn	Lys	Ile	Lys	Arg
50						55					60				
Ala	Ile	Arg	Glu	Asn	Phe	Lys	Val	His	Lys	Ser	His	Ile	Leu	Ala	Lys
65					70					75					80
Asp	Ile	Ile	Val	Ile	Ala	Arg	Gln	Pro	Ala	Lys	Asp	Met	Thr	Thr	Leu
				85					90					95	
Gln	Ile	Gln	Asn	Ser	Leu	Glu	His	Val	Leu	Lys	Ile	Ala	Lys	Val	Phe
			100					105					110		
Asn	Lys	Lys	Lys	Ile	Lys										
			115												

<210> 38  
 <211> 117  
 <212> PRT  
 <213> Staphylococcus aureus

Met	Leu	Leu	Glu	Lys	Ala	Tyr	Arg	Ile	Lys	Lys	Asn	Ala	Asp	Phe	Gln
1				5					10				15		
Arg	Ile	Tyr	Lys	Lys	Gly	His	Ser	Val	Ala	Asn	Arg	Gln	Phe	Val	Val
			20					25					30		
Tyr	Thr	Cys	Asn	Asn	Lys	Glu	Ile	Asp	His	Phe	Arg	Leu	Gly	Ile	Ser
		35				40						45			
Val	Ser	Lys	Lys	Leu	Gly	Asn	Ala	Val	Leu	Arg	Asn	Lys	Ile	Lys	Arg
	50				55					60					
Ala	Ile	Arg	Glu	Asn	Phe	Lys	Val	His	Lys	Ser	His	Ile	Leu	Ala	Lys
65				70					75						80
Asp	Ile	Ile	Val	Ile	Ala	Arg	Gln	Pro	Ala	Lys	Asp	Met	Thr	Thr	Leu
				85					90					95	
Gln	Ile	Gln	Asn	Ser	Leu	Glu	His	Val	Leu	Lys	Ile	Ala	Lys	Val	Phe
			100					105					110		
Asn	Lys	Lys	Lys	Ile	Lys										
			115												

<210> 39  
 <211> 46  
 <212> PRT  
 <213> Escherichia coli

Leu	Arg	Leu	Leu	Thr	Pro	Ser	Gln	Phe	Thr	Arg	Ile	Gly	Leu	Thr	Val
1				5					10				15		
Ala	Lys	Lys	Asn	Val	Arg	Arg	Ala	His	Glu	Arg	Asn	Arg	Ile	Lys	Arg
			20					25					30		
Leu	Thr	Arg	Glu	Leu	Asp	Phe	Val	Val	Leu	Ser	Glu	Ala	Leu		
			35				40					45			

<210> 40  
 <211> 46  
 <212> PRT  
 <213> Proteus mirabilis

Leu	Arg	Leu	Leu	Thr	Pro	Lys	His	Phe	Asn	Arg	Ile	Gly	Leu	Thr	Ile
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1	5	10	15
Ala Lys Lys Asn Val Lys Arg Ala His Glu Arg Asn Arg Ile Lys Arg			
	20	25	30
Leu Ala Arg Glu Leu Asp Phe Val Val Leu Thr Glu Val Leu			
35	40	45	

<210> 41  
 <211> 46  
 <212> PRT  
 <213> Haemophilus influenzae

<400> 41
Leu Arg Leu Leu Thr Pro Ile Gln Phe Lys Arg Leu Gly Leu Thr Val
1 5 10 15
Ala Lys Lys His Leu Lys Arg Ala His Glu Arg Asn Arg Ile Lys Arg
20 25 30
Leu Val Arg Glu Leu Asp Phe Val Phe Phe Ala Gln Ile Leu
35 40 45

<210> 42  
 <211> 46  
 <212> PRT  
 <213> Pseudomonas putida

<400> 42
Lys Arg Leu Leu Thr Pro Arg His Phe Lys Arg Leu Gly Leu Val Ile
1 5 10 15
Gly Lys Lys Ser Val Lys Leu Ala Val Gln Arg Asn Arg Leu Lys Arg
20 25 30
Leu Met Arg Asp Leu Asp Ile Val Ile Leu His Gln His Phe
35 40 45

<210> 43  
 <211> 46  
 <212> PRT  
 <213> Buchnera aphidicola

<400> 43
Ser Lys Leu Leu Lys Ser Thr Asn Phe Gln Arg Leu Gly Leu Ser Ile
1 5 10 15
Ser Arg Lys Asn Ile Lys His Ala Tyr Arg Arg Asn Lys Ile Lys Arg
20 25 30
Leu Ile Arg Glu Leu Asp Phe Val Val Ile Val Asn Ile Leu
35 40 45

<210> 44  
 <211> 46  
 <212> PRT  
 <213> Salmonella typhi

<220>  
 <221> VARIANT  
 <222> 31

<223> Xaa = Any Amino Acid

<400> 44

Leu	Arg	Leu	Leu	Thr	Pro	Ala	His	Phe	Thr	Arg	Ile	Gly	Leu	Thr	Val
1				5					10					15	
Ala	Lys	Lys	Asn	Val	Arg	Arg	Ala	His	Glu	Arg	Xaa	Arg	Ile	Lys	Arg
			20					25					30		
Leu	Thr	Arg	Glu	Leu	Asp	Phe	Val	Val	Leu	Ser	Glu	Ala	Leu		
		35					40					45			

<210> 45

<211> 46

<212> PRT

<213> *Yersinia pestis*

<400> 45

Leu	Arg	Leu	Leu	Thr	Pro	Ser	His	Phe	Thr	Arg	Ile	Gly	Leu	Thr	Val
1				5					10					15	
Ala	Lys	Lys	His	Val	Lys	Arg	Ala	His	Glu	Arg	Asn	Arg	Ile	Lys	Arg
			20					25					30		
Leu	Thr	Arg	Glu	Leu	Asp	Phe	Val	Val	Leu	Thr	Glu	Ala	Leu		
		35					40					45			

<210> 46

<211> 46

<212> PRT

<213> *Klebsiella pneumoniae*

<400> 46

Leu	Arg	Leu	Leu	Thr	Pro	Ser	His	Phe	Thr	Arg	Ile	Gly	Leu	Thr	Val
1				5					10					15	
Ala	Lys	Lys	Asn	Val	Lys	Arg	Ala	His	Glu	Arg	Asn	Arg	Ile	Lys	Arg
			20					25					30		
Leu	Thr	Arg	Glu	Leu	Asp	Phe	Val	Val	Leu	Ser	Glu	Ala	Leu		
		35					40					45			

<210> 47

<211> 44

<212> PRT

<213> *Salmonella paratyphi*

<400> 47

Ile	Arg	Leu	Pro	Ala	Thr	Ser	Thr	Arg	Ile	Gly	Leu	Thr	Val	Ala	Lys
1				5					10					15	
Lys	Asn	Val	Arg	Arg	Ala	His	Glu	Arg	Asn	Arg	Ile	Lys	Arg	Leu	Thr
			20				25					30			
Arg	Glu	Leu	Asp	Phe	Val	Val	Leu	Ser	Glu	Ala	Leu				
		35					40								

<210> 48

<211> 46

<212> PRT

<213> *Vibrio cholerae*



<400> 48

Leu	Arg	Leu	Leu	Thr	Pro	Glu	His	Tyr	Gln	Arg	Leu	Gly	Leu	Ala	Val
1				5					10					15	
Pro	Lys	Lys	Gln	Ile	Lys	Thr	Ala	Val	Gly	Arg	Asn	Arg	Phe	Lys	Arg
			20					25					30		
Ile	Cys	Arg	Glu	Leu	Asp	Phe	Val	Val	Leu	Phe	Asn	Leu	Leu		
		35					40					45			

<210> 49

<211> 46

<212> PRT

<213> *Pseudomonas aeruginosa*

<400> 49

Lys	Arg	Leu	Leu	Thr	Ala	Arg	Gln	Phe	Ser	Arg	Leu	Gly	Leu	Val	Ile
1				5					10					15	
Gly	Lys	Lys	Asn	Val	Lys	Leu	Ala	Val	Gln	Arg	Asn	Arg	Leu	Lys	Arg
			20					25					30		
Leu	Ile	Arg	Glu	Leu	Asp	Ile	Val	Val	Leu	His	Gln	Gln	Phe		
		35					40					45			

<210> 50

<211> 46

<212> PRT

<213> *Shewanella putrefaciens*

<400> 50

Leu	Arg	Leu	Leu	Thr	Pro	Ala	Gln	Phe	Lys	Arg	Leu	Gly	Leu	Thr	Val
1				5					10					15	
Ala	Lys	Arg	Tyr	Val	Lys	Arg	Ala	Asn	Gln	Arg	Asn	Arg	Ile	Lys	Arg
			20					25					30		
Val	Ile	Arg	Asp	Ile	Asp	Ile	Val	Val	Leu	Asn	Lys	Leu	Ile		
		35					40					45			

<210> 51

<211> 46

<212> PRT

<213> *Coxiella burnetii*

<400> 51

Trp	Arg	Ile	Arg	Thr	Thr	Ala	Glu	Phe	Arg	Arg	Leu	Gly	Val	Val	Ala
1				5					10					15	
Ser	Lys	Arg	Asn	Val	Arg	Lys	Ala	Val	Trp	Arg	Asn	Arg	Val	Arg	Arg
			20					25					30		
Val	Val	Lys	Glu	Leu	Asp	Ile	Val	Val	Leu	Tyr	Glu	Cys	Ile		
		35					40					45			

<210> 52

<211> 46

<212> PRT

<213> *Rickettsia prowazekii*

<400> 52  
 Thr Ser Leu Lys Asn Gln Lys Glu Phe Glu Leu Gly Ile Lys Val Ser  
 1 5 10 15  
 Arg Lys Leu Asn Lys Lys Ala Val Val Arg Asn Lys Ile Lys Arg Arg  
 20 25 30  
 Ile Arg His Ser Asn Ala Ile Ile Ile Leu Gln Tyr Glu Leu  
 35 40 45

<210> 53  
 <211> 51  
 <212> PRT  
 <213> *Caulobacter crescentus*

<400> 53  
 Glu Arg Leu Arg Lys Arg Pro Asp Phe Leu Arg Val Gly Phe Thr Ala  
 1 5 10 15  
 Thr Lys Lys Ile Gly Gly Ala Val Glu Arg Asn Arg Ala Lys Arg Arg  
 20 25 30  
 Leu Arg Glu Pro Leu His Asp Tyr Val Phe Leu Leu Asp Asp Val Lys  
 35 40 45  
 Thr Ala Leu  
 50

<210> 54  
 <211> 50  
 <212> PRT  
 <213> *Helicobacter pylori* 26695

<400> 54  
 Asp Ser Leu Lys Asn Lys Ser Glu Phe Asp Lys Leu Gly Leu Ser Val  
 1 5 10 15  
 Ser Lys Lys Val Gly Asn Ala Val Lys Arg Asn Leu Ile Lys Arg Arg  
 20 25 30  
 Leu Arg Ser Cys Gln Ala Leu Val Phe Leu Glu Lys His Phe Leu Glu  
 35 40 45  
 Met Leu  
 50

<210> 55  
 <211> 50  
 <212> PRT  
 <213> *Helicobacter pylori* J99

<400> 55  
 Asp Ser Leu Lys Asn Lys Ser Glu Phe Asp Lys Leu Gly Leu Ser Val  
 1 5 10 15  
 Ser Lys Lys Val Gly Asn Ala Val Lys Arg Asn Leu Ile Lys Arg Arg  
 20 25 30  
 Leu Arg Ser Cys Gln Ala Leu Val Phe Leu Glu Lys His Phe Leu Glu  
 35 40 45  
 Met Leu  
 50

<210> 56  
 <211> 50  
 <212> PRT  
 <213> *Camphylobacter jejuni*

<400> 56  
 Asp Lys Phe Ser Thr Asn Glu Glu Phe Ser Lys Ile Ala Val Val Ala  
 1 5 10 15  
 Ser Lys Lys Val Gly Lys Ala Val Val Arg Asn Arg Ser Lys Arg Ile  
 20 25 30  
 Leu Arg Ala Leu Gln Lys Tyr Ile Phe Leu Glu Lys Asn Leu Lys Trp  
 35 40 45  
 Gly Leu  
 50

<210> 57  
 <211> 46  
 <212> PRT  
 <213> *Neisseria gonorrhoeae*

<400> 57  
 Tyr Arg Leu Leu Lys Thr Asp Asp Phe Ser Arg Ile Gly Leu Val Val  
 1 5 10 15  
 Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg Asn Tyr Met Lys Arg  
 20 25 30  
 Val Ile Arg Asp Leu Asp Phe Val Val Ala Arg Ala Glu Leu  
 35 40 45

<210> 58  
 <211> 46  
 <212> PRT  
 <213> *Neisseria meningitidis*

<400> 58  
 Tyr Arg Leu Leu Lys Thr Asp Asp Phe Ser Arg Ile Gly Leu Val Val  
 1 5 10 15  
 Gly Lys Lys Thr Ala Lys Arg Ala Asn Glu Arg Asn Tyr Met Lys Arg  
 20 25 30  
 Val Ile Arg Asp Leu Asp Phe Val Val Ala Arg Ala Glu Leu  
 35 40 45

<210> 59  
 <211> 50  
 <212> PRT  
 <213> *Bordetella pertussis*

<400> 59  
 Ala Arg Leu His Arg Pro Ser Glu Phe Ala Arg Leu Gly Leu Val Ile  
 1 5 10 15  
 Ala Lys Arg Phe Ala Ala Arg Ala Val Thr Arg Asn Thr Leu Lys Arg  
 20 25 30  
 Val Ile Arg Glu Leu Asp Tyr Val Val Leu Lys Arg Ser Ala Arg Ala  
 35 40 45  
 Glu Val

<210> 60  
 <211> 45  
 <212> PRT  
 <213> *Thiobacillus ferrooxidans*

<400> 60  
 Asp Arg Leu Arg Gln Lys Val Ala Ile Gln Arg Leu Gly Leu Ala Val  
 1 5 10 15  
 Ser Arg Lys Val Gly Asn Ala Val Val Arg Asn Arg Ile Lys Arg Arg  
 20 25 30  
 Leu Arg Glu Thr Asp Val Leu Val Met Gly Ala Tyr Leu  
 35 40 45

<210> 61  
 <211> 46  
 <212> PRT  
 <213> *Streptomyces bikiniensis*

<400> 61  
 Asn Arg Leu Arg Arg Arg Glu Asp Phe Ala Arg Ala Gly Phe Val Val  
 1 5 10 15  
 Ser Lys Ala Val Gly Gly Ala Val Val Arg Asn Gln Val Lys Arg Arg  
 20 25 30  
 Leu Arg His Leu Pro Leu Val Val Leu Ala Arg Asp Leu  
 35 40 45

<210> 62  
 <211> 46  
 <212> PRT  
 <213> *Streptomyces coelicolor*

<400> 62  
 Asn Arg Leu Arg Arg Arg Glu Asp Phe Ala Arg Ala Gly Phe Val Val  
 1 5 10 15  
 Ser Lys Ala Val Gly Val Ala Val Val Arg Asn Lys Val Lys Arg Arg  
 20 25 30  
 Leu Arg His Leu Pro Leu Val Val Leu Ala Arg Asp Leu  
 35 40 45

<210> 63  
 <211> 51  
 <212> PRT  
 <213> *Micrococcus luteus*

<400> 63  
 Arg Arg Val Arg Thr Pro Ala Glu Phe Arg Arg Ala Gly Phe Val Val  
 1 5 10 15  
 Ser Lys Ala Val Gly Asn Ala Val Thr Arg Asn Arg Val Lys Arg Arg  
 20 25 30  
 Leu Arg Ala Leu Pro Val Leu Val Gln Val Leu Arg Arg Glu Thr Val  
 35 40 45

Gly Ala Leu  
50

<210> 64  
<211> 47  
<212> PRT  
<213> *Mycobacterium tuberculosis*

<400> 64  
Asn Arg Met Arg Arg Ser Ala Asp Phe Glu Arg Val Gly Leu Ile Ile  
1 5 10 15  
Ala Lys Ser Val Gly Ser Ala Val Glu Arg His Arg Val Ala Arg Arg  
20 25 30  
Leu Arg His Leu His Asp His Val Val Ile Leu Glu Gln Gln Leu  
35 40 45

<210> 65  
<211> 47  
<212> PRT  
<213> *Mycobacterium leprae*

<400> 65  
Asn Arg Met Arg Arg Ser Ser Glu Phe Asp His Val Gly Leu Ile Ile  
1 5 10 15  
Ala Lys Thr Val Gly Ser Ala Val Glu Arg His Arg Val Ala Arg Arg  
20 25 30  
Leu Arg His Leu Gly Asp Gln Val Val Ile Leu Ala Gln Gln Leu  
35 40 45

<210> 66  
<211> 47  
<212> PRT  
<213> *Mycobacterium bovis*

<400> 66  
Asn Arg Met Arg Arg Ser Ala Asp Phe Glu Arg Val Gly Leu Ile Ile  
1 5 10 15  
Ala Lys Ser Val Gly Ser Ala Val Glu Arg His Arg Val Ala Arg Arg  
20 25 30  
Leu Arg His Leu His Asp His Val Val Ile Leu Glu Gln Gln Leu  
35 40 45

<210> 67  
<211> 47  
<212> PRT  
<213> *Mycobacterium avium*

<400> 67  
Asn Arg Met Thr Arg Ser Thr Glu Phe Asp Arg Val Gly Leu Val Val  
1 5 10 15  
Gly Lys Ala Val Gly Thr Ala Val Gln Arg His Arg Val Ala Arg Arg  
20 25 30  
Leu Arg His Leu Glu Asp Arg Leu Val Ile Leu Ala Gln Glu Leu

35

40

45

&lt;210&gt; 68

&lt;211&gt; 48

&lt;212&gt; PRT

<213> *Corynebacterium diphtheriae*

&lt;400&gt; 68

His	Lys	Leu	Ser	Asn	Ser	Glu	Gln	Phe	Arg	Arg	Phe	Gly	Leu	Val	Val
1				5				10					15		
Ser	Lys	Ala	Val	Gly	Asn	Ala	Val	Thr	Arg	His	Arg	Val	Ser	Arg	Gln
		20						25				30			
Leu	Arg	His	Phe	His	Val	Val	Leu	Arg	Ala	Asp	Val	Gln	Ala	Ala	Leu
	35						40					45			

&lt;210&gt; 69

&lt;211&gt; 45

&lt;212&gt; PRT

<213> *Thermotoga maritima*

&lt;400&gt; 69

Glu	Arg	Leu	Arg	Leu	Arg	Arg	Asp	Phe	Leu	Arg	Leu	Gly	Ile	Val	Val
1				5				10					15		
Lys	Arg	Lys	Phe	Gly	Lys	Ala	Thr	Arg	Arg	Asn	Lys	Leu	Lys	Arg	Trp
		20						25				30			
Val	Arg	Glu	Ile	Asp	Ile	Val	Val	Val	Arg	Glu	Lys	Leu			
	35						40					45			

&lt;210&gt; 70

&lt;211&gt; 52

&lt;212&gt; PRT

<213> *Porphyromonas gingivalis*

&lt;400&gt; 70

Glu	Arg	Leu	Tyr	Leu	Arg	Asp	Glu	Ile	Asn	Thr	Val	Phe	Ser	Met	Leu
1				5				10					15		
Val	Ser	Val	Ala	Lys	Lys	Arg	Phe	Arg	Arg	Ala	Val	Lys	Arg	Asn	Arg
		20						25				30			
Val	Arg	Arg	Leu	Val	Arg	Glu	Leu	Asp	Val	Leu	Leu	Pro	Asp	Phe	Arg
	35						40					45			
Thr	Val	Glu	Arg												
	50														

&lt;210&gt; 71

&lt;211&gt; 49

&lt;212&gt; PRT

<213> *Deinococcus radiodurans*

&lt;400&gt; 71

Leu	Arg	Gly	Glu	Arg	Glu	Phe	Arg	Arg	Ile	Gly	Leu	Val	Val	Ser	Lys
1				5				10					15		
Lys	Thr	Leu	Lys	His	Ala	Val	Lys	Arg	Asn	Arg	Ala	Arg	Arg	Arg	Val
		20						25					30		

Arg Glu Leu Leu Arg Ala Ile Leu Leu Ala Gln Ala Leu Gln Arg Gly  
 35 40 45  
 Ala

<210> 72  
 <211> 49  
 <212> PRT  
 <213> Chlorobium tepidum

<400> 72  
 Ala Arg Leu Lys Gly Gly Phe Leu Arg Val Leu Phe Thr Val Gly Lys  
 1 5 10 15  
 Lys Leu Val Pro Arg Ala Val Asp Arg Asn Arg Ile Lys Arg Leu Met  
 20 25 30  
 Arg Glu Leu Thr Asp His Gln Val Leu Glu Arg Phe Arg Ala Ile Arg  
 35 40 45  
 His

<210> 73  
 <211> 46  
 <212> PRT  
 <213> Bacillus subtilis

<400> 73  
 Asn Arg Leu Lys Lys Asn Glu Asp Phe Gln Arg Val Gly Leu Ser Val  
 1 5 10 15  
 Ser Lys Lys Ile Gly Asn Ala Val Met Arg Asn Arg Ile Lys Arg Leu  
 20 25 30  
 Ile Arg Gln Leu Lys Asp Tyr Ile Ile Thr Lys Lys Ser Leu  
 35 40 45

<210> 74  
 <211> 45  
 <212> PRT  
 <213> Bacillus halodurans

<400> 74  
 His Arg Ile Lys Arg Ser Asp Glu Phe Ser Arg Val Leu Ser Val Ser  
 1 5 10 15  
 Lys Lys Ile Gly Asn Ala Val Thr Arg Asn Arg Val Lys Arg Leu Ile  
 20 25 30  
 Arg Thr Ile Ser Asp Tyr Val Ile Val Lys Gly Ser Leu  
 35 40 45

<210> 75  
 <211> 46  
 <212> PRT  
 <213> Bacillus anthracis

<400> 75  
 His Arg Ile Lys Lys Asn Asp Glu Phe Gln Arg Ile Gly Leu Ser Val

1	5	10	15
Ser Lys Lys Ile Gly Asn Ala Val Val Arg Asn Arg Ile Lys Arg Met			
	20	25	30
Ile Arg Gln Ile Asp Asp Phe Val Ile Leu Lys Lys Ser Leu			
35	40	45	

<210> 76  
 <211> 46  
 <212> PRT  
 <213> Mycoplasma capricolum

<400> 76
Arg Val Ile Lys Lys Asn Phe Glu Phe Gln Lys Tyr Gly Ile Ser Val
1 5 10 15
Gly Lys Lys Ile Gly Asn Ala Val Ile Arg Asn Lys Val Lys Arg Gln
20 25 30
Ile Arg Met Ile Gly Asp Ile Ile Ile Leu Ser Lys Leu Leu
35 40 45

<210> 77  
 <211> 47  
 <212> PRT  
 <213> Mycoplasma pneumoniae

<400> 77
His His Leu Arg Asp Arg Lys Val Phe Ala Arg Ala Ala Val Ser Ile
1 5 10 15
Ser Lys Thr Lys Tyr Lys Leu Ala Val Glu Arg Asn Leu Ile Arg Arg
20 25 30
Gln Val Lys Ala Leu Asn Asp Val Leu Val Lys Gln Thr Ile Phe
35 40 45

<210> 78  
 <211> 47  
 <212> PRT  
 <213> Mycoplasma genitalium

<400> 78
His Ser Leu Arg Glu Arg Lys Val Phe Thr Arg Val Ala Ile Ser Ile
1 5 10 15
Ala Lys Thr Lys Tyr Lys Leu Ala Val Gln Arg Asn Leu Ile Lys Arg
20 25 30
Gln Ile Arg Ser Leu Glu Asp Ile Leu Val Lys Gln Lys Leu Phe
35 40 45

<210> 79  
 <211> 44  
 <212> PRT  
 <213> Streptococcus pyogenes

<400> 79
Val Lys Arg Glu Lys Asp Phe Gln Arg Val Gly Ile Ser Val Gly Lys
1 5 10 15



Lys Ile Gly Asn Ala Val Thr Arg Asn Ala Val Lys Arg Lys Ile Arg  
                   20                  25                  30  
 His Leu Lys Asp Phe Val Val Leu Gln Gln Asn Leu  
           35                  40

<210> 80  
 <211> 46  
 <212> PRT  
 <213> Streptococcus mutans

<400> 80  
 Tyr Arg Val Lys Ser Asp Lys Asp Phe Gln Arg Val Gly Leu Ser Val  
   1                  5                  10                  15  
 Gly Lys Arg Leu Gly Asn Ala Val Val Arg Asn Ala Ile Lys Arg Lys  
           20                  25                  30  
 Leu Arg His Leu Gly Asp Phe Val Val Met Lys Lys Asn Leu  
           35                  40                  45

<210> 81  
 <211> 46  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 81  
 Phe Arg Val Lys Arg Glu Lys Asp Phe Lys Arg Val Gly Leu Ser Val  
   1                  5                  10                  15  
 Ser Lys Lys Leu Gly Asn Ala Val Thr Arg Asn Gln Ile Lys Arg Arg  
           20                  25                  30  
 Ile Arg His Leu Val Asp Phe Val Val Met Glu Lys Asn Leu  
           35                  40                  45

<210> 82  
 <211> 46  
 <212> PRT  
 <213> Staphylococcus aureus NCTC

<400> 82  
 Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gln Arg Leu Gly Ile Ser Val  
   1                  5                  10                  15  
 Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg Ala  
           20                  25                  30  
 Ile Arg Glu Ile Leu Asp Ile Ile Val Ile Gln Asn Ser Leu  
           35                  40                  45

<210> 83  
 <211> 46  
 <212> PRT  
 <213> Staphylococcus aureus COL

<400> 83  
 Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gln Arg Leu Gly Ile Ser Val  
   1                  5                  10                  15  
 Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg Ala

	20		25		30								
Ile	Arg	Glu	Ile	Leu	Asp	Ile	Ile	Val	Ile	Gln	Asn	Ser	Leu
	35		40		45								

<210> 84  
 <211> 46  
 <212> PRT  
 <213> Clostridium difficile

<400> 84															
Lys	Gly	Leu	Lys	Lys	Asp	Ser	Asp	Phe	Arg	Arg	Val	Gly	Ile	Ser	Val
1			5					10					15		
Ser	Lys	Lys	Val	Gly	Lys	Ala	Ile	Thr	Arg	Asn	Arg	Val	Arg	Arg	Leu
		20						25					30		
Ile	Lys	Glu	Lys	Ile	Lys	Asp	Ile	Val	Phe	Ile	Lys	Asn	Leu		
	35						40					45			

<210> 85  
 <211> 47  
 <212> PRT  
 <213> Synechocystis PCC6803

<400> 85															
Leu	Arg	Leu	Lys	His	Trp	Gln	Asp	Phe	Gln	Arg	Phe	Gly	Ile	Thr	Val
1			5					10					15		
Ser	Gln	Lys	Val	Ser	Lys	Lys	Ala	Thr	Val	Arg	Asn	Arg	Leu	Lys	Arg
		20						25					30		
Gln	Ile	Arg	Ala	Ile	Lys	Asp	Val	Val	Ile	Phe	Leu	Arg	Glu	Leu	
	35						40					45			

<210> 86  
 <211> 47  
 <212> PRT  
 <213> Pseudanabaena PCC6903

<400> 86															
Asn	Arg	Leu	Arg	Arg	Arg	Glu	Asp	Phe	Ala	Arg	Ile	Gly	Ile	Val	Val
1			5					10					15		
Ser	Lys	Lys	Val	Ser	Lys	Leu	Ala	Val	Thr	Arg	Asn	Arg	Phe	Lys	Arg
		20						25					30		
Gln	Leu	Arg	Ala	Leu	Lys	Gln	Ile	Val	Val	Leu	Gly	Asp	Asp	Leu	
	35						40					45			

<210> 87  
 <211> 46  
 <212> PRT  
 <213> Borrelia burgdorferi

<400> 87															
Ile	Ser	Leu	Lys	Ser	Lys	Ile	Glu	Ile	Gln	Arg	Ile	Leu	Val	Thr	Phe
1			5					10					15		
Ser	Lys	Gly	Phe	Arg	Gly	Ser	Val	Lys	Arg	Asn	Arg	Ile	Arg	Arg	Leu
		20						25					30		

Phe Lys Glu Leu Glu Asp Ile Ile Phe Ile Glu Ser Leu Met  
 35 40 45

<210> 88  
 <211> 46  
 <212> PRT  
 <213> *Treponema pallidum*

<400> 88  
 Glu Arg Leu Arg Gly Ser Cys Arg Val Arg Arg Phe Leu Ala Thr Phe  
 1 5 10 15  
 Arg Arg Gly Tyr Gly Lys Ala Val Ala Arg Asn Arg Ala Arg Arg Leu  
 20 25 30  
 Ser Lys Glu Leu Val Asp Leu Val Leu Leu Leu Cys Val Leu  
 35 40 45

<210> 89  
 <211> 49  
 <212> PRT  
 <213> *Chlamydia trachomatis*

<400> 89  
 Ala Arg Leu Leu Lys Arg Lys Gln Phe Val Lys Val Gly Ile Thr Val  
 1 5 10 15  
 Ser Lys Lys Phe Gly Lys Ala His Gln Arg Asn Arg Phe Lys Arg Ile  
 20 25 30  
 Val Arg Glu Leu Gln Val Val Ile Leu Ser Glu Glu Leu Leu Gln Arg  
 35 40 45  
 Ile

<210> 90  
 <211> 49  
 <212> PRT  
 <213> *Chlamydia trachomatis* MoPn

<400> 90  
 Ala Arg Leu Leu Lys Arg Lys Gln Phe Val Lys Val Gly Val Thr Val  
 1 5 10 15  
 Ser Lys Lys Phe Gly Lys Ala His Gln Arg Asn Arg Phe Lys Arg Ile  
 20 25 30  
 Val Arg Glu Leu Gln Val Val Val Leu Ser Ala Asp Leu Leu Lys His  
 35 40 45  
 Ile

<210> 91  
 <211> 49  
 <212> PRT  
 <213> *Chlamydia pneumoniae*

<400> 91  
 Ser Arg Val Leu Lys Arg Lys Gln Phe Leu Arg Met Gly Ile Thr Val

1		5		10		15									
Ser	Lys	Lys	Phe	Gly	Lys	Ala	His	Glu	Arg	Asn	Ser	Phe	Lys	Arg	Val
		20						25					30		
Val	Arg	Glu	Leu	Gln	Ile	Val	Val	Leu	Leu	Gln	Asp	Phe	Ile	Asn	Gln
		35					40					45			
Ile															

<210> 92  
 <211> 118  
 <212> PRT  
 <213> Salmonella typhi

<220>  
 <221> VARIANT  
 <222> 63  
 <223> Xaa = any amino acid

<400> 92
Val Val Lys Leu Ala Phe Pro Arg Glu Leu Arg Leu Leu Thr Pro Ala
1 5 10 15
His Phe Thr Phe Val Phe Gln Gln Pro Gln Arg Ala Gly Thr Pro Gln
20 25 30
Ile Thr Xaa Leu Gly Arg Leu Asn Ser Leu Gly His Pro Arg Ile Gly
35 40 45
Leu Thr Val Ala Lys Lys Asn Val Arg Arg Ala His Glu Arg Xaa Arg
50 55 60
Ile Lys Arg Leu Thr Arg Glu Ser Phe Arg Leu Arg Gln His Glu Leu
65 70 75 80
Pro Ala Met Asp Phe Val Val Val Ala Lys Lys Gly Val Ala Asp Leu
85 90 95
Asp Asn Arg Ala Leu Ser Glu Ala Leu Glu Lys Leu Trp Arg Arg His
100 105 110
Cys Arg Leu Ala Arg Gly
115

<210> 93  
 <211> 119  
 <212> PRT  
 <213> Yersinia pestis

<400> 93
Val Val Lys Leu Ala Phe Pro Arg Glu Leu Arg Leu Leu Thr Pro Ser
1 5 10 15
His Phe Thr Phe Val Phe Gln Gln Pro Gln Arg Ala Gly Thr Pro Gln
20 25 30
Ile Thr Ile Leu Gly Arg Leu Asn Glu Leu Gly His Pro Arg Ile Gly
35 40 45
Leu Thr Val Ala Lys Lys His Val Lys Arg Ala His Glu Arg Asn Arg
50 55 60
Ile Lys Arg Leu Thr Arg Glu Ser Phe Arg Leu His Gln His Ala Leu
65 70 75 80
Pro Ser Met Asp Phe Val Val Leu Val Lys Lys Gly Val Ala Asp Leu
85 90 95
Asp Asn Arg Ala Leu Thr Glu Ala Leu Glu Lys Leu Trp Arg Arg His

	100	105	110
Cys Arg Gln Ala Pro Ala Ser			
115			

<210> 94  
 <211> 115  
 <212> PRT  
 <213> Mycobacterium bovis

<400> 94  
 Val Leu Arg Ala Arg Asn Arg Met Arg Arg Ser Ala Asp Phe Glu Thr  
 1 5 10 15  
 Thr Val Lys His Gly Met Arg Thr Val Arg Ser Asp Met Val Val Tyr  
 20 25 30  
 Trp Trp Arg Gly Ser Gly Gly Gly Pro Arg Val Gly Leu Ile Ile Ala  
 35 40 45  
 Lys Ser Val Gly Ser Ala Val Glu Arg His Arg Val Ala Arg Arg Leu  
 50 55 60  
 Arg His Val Ala Gly Ser Ile Val Lys Glu Leu His Pro Ser Asp His  
 65 70 75 80  
 Val Val Ile Arg Ala Leu Pro Ser Ser Arg His Val Ser Ser Ala Arg  
 85 90 95  
 Leu Glu Gln Gln Leu Arg Cys Gly Leu Arg Arg Ala Val Glu Leu Ala  
 100 105 110  
 Gly Ser Asp  
 115

<210> 95  
 <211> 136  
 <212> PRT  
 <213> H. influenza

<400> 95  
 Met Leu Lys Val Val Lys Val Tyr Leu His Asn His Asn Ser Gln Phe  
 1 5 10 15  
 Leu Val Val Lys Leu Asn Phe Ser Arg Glu Leu Arg Leu Leu Thr Pro  
 20 25 30  
 Ile Gln Phe Lys Asn Val Phe Glu Gln Pro Phe Arg Ala Ser Thr Pro  
 35 40 45  
 Glu Ile Thr Ile Leu Ala Arg Lys Asn Asn Leu Glu His Pro Arg Leu  
 50 55 60  
 Gly Leu Thr Val Ala Lys Lys His Leu Lys Arg Ala His Glu Arg Asn  
 65 70 75 80  
 Arg Ile Lys Arg Leu Val Arg Glu Ser Phe Arg Leu Ser Gln His Arg  
 85 90 95  
 Leu Pro Ala Tyr Asp Phe Val Phe Val Ala Lys Asn Gly Ile Gly Lys  
 100 105 110  
 Leu Asp Asn Asn Thr Phe Ala Gln Ile Leu Glu Lys Leu Trp Gln Arg  
 115 120 125  
 His Ile Arg Leu Ala Gln Lys Ser  
 130 135

<210> 96  
 <211> 125

<212> PRT

<213> M. tuberculosis-2

<400> 96

```
Met Ile Ala Thr Pro Gly Leu Phe Ala Val Leu Arg Ala Arg Asn Arg
 1           5           10           15
Met Arg Arg Ser Ala Asp Phe Glu Thr Val Lys His Gly Met Arg
          20           25           30
Thr Val Arg Ser Asp Met Val Val Tyr Trp Trp Arg Gly Ser Gly Gly
          35           40           45
Gly Pro Arg Val Gly Leu Ile Ile Ala Lys Ser Val Gly Ser Ala Val
          50           55           60
Glu Arg His Arg Val Ala Arg Arg Leu Arg His Val Ala Gly Ser Ile
65           70           75           80
Val Lys Glu Leu His Pro Ser Asp His Val Val Ile Arg Ala Leu Pro
          85           90           95
Ser Ser Arg His Val Ser Ser Ala Arg Leu Glu Gln Gln Leu Arg Cys
          100          105          110
Gly Leu Arg Arg Ala Val Glu Leu Ala Gly Ser Asp Arg
          115          120          125
```

<210> 97

<211> 117

<212> PRT

<213> Staphylococcus aureus

<400> 97

```
Met Leu Leu Glu Lys Val Tyr Arg Ile Lys Lys Asn Ala Asp Phe Gly
 1           5           10           15
Arg Ile Tyr Lys Lys Gly His Ser Val Ala Asn Arg Gln Phe Val Val
          20           25           30
Tyr Thr Cys Asn Asn Lys Glu Ile Asp His Phe Arg Leu Gly Ile Ser
          35           40           45
Val Ser Lys Lys Leu Gly Asn Ala Val Leu Arg Asn Lys Ile Lys Arg
          50           55           60
Ala Ile Arg Glu Asn Phe Lys Val His Lys Ser His Ile Leu Ala Lys
65           70           75           80
Asp Ile Ile Val Ile Ala Arg Gln Pro Ala Lys Asp Met Thr Thr Leu
          85           90           95
Gln Ile Gln Asn Ser Leu Glu His Val Leu Lys Ile Ala Lys Val Phe
          100          105          110
Asn Lys Lys Ile Lys
          115
```

<210> 98

<211> 112

<212> PRT

<213> Staphylococcus pneumonia

<400> 98

```
Leu Lys Lys Asn Phe Arg Val Lys Arg Glu Lys Asp Phe Lys Ala Ile
 1           5           10           15
Phe Lys Glu Gly Thr Ser Phe Ala Asn Arg Lys Phe Val Val Tyr Gln
          20           25           30
Leu Glu Asn Gln Lys Asn His Phe Arg Val Gly Leu Ser Val Ser Lys
```

		35					40					45					
Lys	Leu	Gly	Asn	Ala	Val	Thr	Arg	Asn	Gln	Ile	Lys	Arg	Arg	Ile	Arg		
	50						55					60					
His	Ile	Ile	Gln	Asn	Ala	Lys	Gly	Ser	Leu	Val	Glu	Asp	Val	Asp	Phe		
65					70					75					80		
Val	Val	Ile	Ala	Arg	Lys	Gly	Val	Glu	Thr	Leu	Gly	Tyr	Ala	Glu	Met		
				85					90					95			
Glu	Lys	Asn	Leu	Leu	His	Val	Leu	Lys	Leu	Ser	Lys	Ile	Tyr	Arg	Glu		
			100					105					110				